**SYLLABUS**

1. **Programme Details**

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| **1.1.** | **GRIGORE T. POPA UNIVERSITY OF MEDICINE AND PHARMACY IASI** |
| **1.2.**  | **FACULTY : MEDICINE / DEPARTMENT: PREVENTIVE MEDICINE AND INTERDISCIPLINARITY** |
| **1.3.** | **DISCIPLINE: MICROBIOLOGY** |
| **1.4.**  | **FIELD of STUDY:** **HEALTH** |
| **1.5.** | **STUDY CYCLE: BACHELOR**  |
| **1.6.** | **PROGRAMME of STUDY: Medicine - English**  |
| 1. **Discipline Details**
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| **2.1.** | **Name of the Discipline:** MICROBIOLOGY |
| **2.2.** | **Teaching staff in charge with lectures:** Professor Dr. Luminiţa Smaranda Iancu, Associate Professor Dr. Ramona Gabriela Ursu |
| **2.3.** | **Teaching staff in charge with seminar activities:** Associate Professor Dr. Ramona Gabriela Ursu, Assit. Drd. Laura Iulia Poloșanu (Grecu), Assist. Drd. Igor Jelihovschi |
| **2.4. Year**  | **II** | **2.5. Semester** | **I****II** | **2.6. Type of evaluation**  | E1E1 | **2.7. Discipline regimen**  | Compulsory |

1. **Overall Time Estimates (hours/semester of didactic activity)**

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| * 1. **Number of hours per week**
 | **4,34** | **Of which: 3.2. lectures** | **1,92** | * 1. **seminar/ laboratory**
 | **2,42** |
| * 1. **Total hours in the curriculum**
 | **126** | **Of which: 3.5. lectures** | **58****Sem I: 30**Micro gen - 14; V:10;PM: 6 **Sem II**Bacte spec. -28 | **3.6. seminar/ laboratory** | **68****Sem I – 28**(MG -12, V:8, PM:8)**Sem II-40**BS-40 |
| **Distribution of time**  |  |  |  |  | Hours |
| **Study time using coursebook materials, bibliography and notes**  | 30 |
| **Further study time in the libray, online and in the field** | 20 |
| **Preparation time for seminars / laboratories, homework, reports, portfolios and essays** | 30 |
| **Tutoring** | 10 |
| **Examinations** | 5 |
| **Other activities** | 5 |
| **3.7. Total hours of individual study** |  | 100 |
| **3.8. Total hours / semester** |  |  50 |
| **3.9. Number of credits**  |  | **8** |

1. **Prerequisites (where applicable)**

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| **4.1. curriculum** |  Biochemistry, Physiology, Biophysics, Cell biology. |
| **4.2. competences** |  Handling optical microscope |

1. **Conditions (where applicable)**

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| **5.1. for lecture delivery** | PC and video system |
| **5.2. for seminar / laboratory delivery** | Tables and floor easy to be clean/disinfected; running water. Disinfectants, soap, hand dry paper. |

1. **Specific Competences Acquired**

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| **Professional Competences (knowledge and skills)** | * avoiding microbial contamination according with different risk condition in medical and surgical practice;
* sampling, transporting and preservation of the pathologic products for microbiological examination;
* smear preparation for bacteriological examination;
* Gram and Ziehl-Neelsen stains;
* preliminary identification of the microorganisms involved in human pathology;
* smear for parasites examination;
* preparation and interpretation of one smear in thick drop;
* interpretation of microbiological analysis bulletin (for direct and sero-immunological results including interpretation of susceptibility tests results);
* correct interpretation of the significance of one isolate.
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| **Transversal Competences (roles, personal and professional development)** | * exercise optimum professional responsibilities;
* oral and written communication skills;
* use of technology and information
* awareness of the need for training.
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1. **Objectives of the Discipline (related to the acquired competences)**

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| **7.1. General Objective** | The main instructional objective of Medical Microbiology is to teach the future medical doctor to see the microorganisms with „the eyes of the mind” and to think microbiologically, in clinical land and epidemiological context. |
| **7.2. Specific Objectives**  | -A. To be aware of the presence and the type of microorganisms on and in human body (both healthy and sick individuals) as well as in the environment.-B. To be aware of the spread of microorganisms and the consequences of contamination.-C. To be aware of contaminations risk in medical settings.-D. To understand the role of microorganisms regarding health and disease condition. |

1. **Content**

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| **6.1. Courses****General Microbiology (6 courses)** | **Teaching method** | **Observation** |
| 1. The history of Microbiology. The world of microorganisms. The functional anatomy of bacteria. The biological, taxonomic and Pathogenetic significance of bacterial structures. |  PPT presentation | 4 |
| 2. Viruses: structure, replication, the virus – host relationship, viral taxonomy, bacteriophages. Classification of parasites and of fungi. | PPT presentation | 2 |
| 3. Nutrition, bacterial growth and cultivation. Microbial genetics  | PPT presentation | 2 |
| 4. Relationship between the microorganisms and human host. Indigenous microbiota.  | PPT presentation | 1 |
| 5. The pathogenicity of microorganisms and anti- infectious defense. Infection.  | PPT presentation | 3 |
| 6. The microbiological bases of infection prophylaxis. The microbiological bases of infection therapy (viral, fungal, parasitic) | PPT presentation | 2 |
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| **Virology (5 courses)** (1 hour at the introductive course, week 3)  |  |  |
| 1. Orthomyxoviruses, paramyxoviruses, coronaviruses, adenoviruses. | PPT presentation | 2 |
| 2. Hepatitis viruses. Herpesviruses | PPT presentation | 2 |
| 3. Retroviruses. Human Papillomaviruses  | PPT presentation | 2 |
| 4. Arboviruses. Roboviruses, Rubella virus | PPT presentation | 2 |
| 5. Picornaviruses. Rabies virus. Rotaviruses.  | PPT presentation | 2 |
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| **Medical parasitology and mycology (3 courses)** (1 hour at the introductive lecture, week 3)  |  |  |
| 1. Protozoan | PPT presentation | 2 |
| 2. Helminthes | PPT presentation | 2 |
| 3. Fungi (including *Pneumocystis*). Ectoparasites | PPT presentation | 2 |
| **Sem II Special Bacteriology (15 courses)**  |  |  |
| 1.Antibiotherapy in bacterial infections and resistance to antibiotics  | PPT presentation | 2 |
| *2.Staphylococcus* Genus | PPT presentation | 2 |
| *3.Streptococcus* and *Enterococcus* Genus | PPT presentation | 2 |
| *4.Neisseria* and *Moraxella* Genus | PPT presentation | 2 |
| 5.Gram negative coco – bacilli: *Haemophilus* genus, HACEK groups, *Bordetella, Brucella, Pasteurella, Francisella*, *Legionella* genus | PPT presentation | 3 |
| *6.Enterobacteriaceae* Family | PPT presentation | 3 |
| 7.Gram negative bacilli, curved shape: *Vibrio*, *Campylobacter*, *Helicobacter* Genus. Gram negative bacilli non-fermentative: *Pseudomonadaceae* family, *Acinetobacter* genus | PPT presentation | 3 |
| 8.Gram positive bacilli non-spore forming: *Corynebacterium, Listeria, Erysipelothrix* genus, *Gardnerella vaginalis* | PPT presentation | 2 |
| 9.Gram positive bacilli spore forming: *Bacillus, Clostridium* genus. Anaerobic non spore forming bacteria | PPT presentation | 2 |
| *10.Mycobacterium* and *Nocardia* genus | PPT presentation | 2 |
| 11.Spirochetaes: *Treponema, Borrelia, Leptospira* genus | PPT presentation | 2 |
| 12.Mycoplasma, bartonellae, chlamydia, rickettsia | PPT presentation | 2 |
| 13. Infections associated with medical assistance  | PPT presentation | 1 |
| **Bibliography** |
| 1. Buiuc D.: Microbiologie Medicală, ed. a VI-a, Editura “Gr. T. Popa” Iaşi, 2003.
2. Murray PR et al.: Medical Microbiology, 8th, Wolfe International Student Edition, 2015.
3. Jawetz Melnick&Adelbergs Medical Microbiology, 26th ed, 2012.
4. Luca Mariana. Parazitologie si Micologie medicala. Editura UMF. Iaşi, 2005.
5. Radulescu Simona. Parazitologie medicală. Editura All Educational, Bucureşti, 2000.
6. Lazar Lidia. Baze practice in parazitologia medicala. Editura Publistar, Bucuresti, 2000.
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| **6.2. Seminar / laboratory** **Sem I – general microbiology (12 hours)** | **Teaching method** | **Observaţion** |
| 1. Demonstration of microorganism's ubiquity  | Demonstration | 3 |
| 2. Microbial decontamination in microbiology laboratory and in medical practice  | Practical acti-vity and oral presentation  | 3 |
| 3. Microscopic exam in bacteriologic diagnosis. Type of staining used in bacterio-logy and parasitology (copro-parasitologic exam, anal imprint and recognition the parasites in blood) | -“- | 3 |
| 4. Cultivation of bacteria | -“- | 3 |
| 5. Cultivation of viruses and fungi | -“- | 3 |
|  6. (a) Antigen – antibodies reactions and molecular biology techniques in microbiology laboratory (b) Laboratory diagnosis of infection  | -“- | 3 |
| **Virology (Sem I) (8 hours)** |  |  |
| 1. Laboratory diagnosis of respiratory infections with viral etiology | -“- | 3 |
| 2. Laboratory diagnosis of viral hepatitis and of infections produced by oncogenic viruses (HPV). | -“- | 3 |
| 3. Laboratory diagnosis of HIV/ AIDS. Diagnosis of infections produced by CMV and EBV  | -“- | 3 |
| 4. Laboratory diagnosis of enteroviruses and surveillance of polio virus circulation. Laboratory diagnosis in rabies. **Test of General Microbiology and Virology (W10)** | -“- | 3 |
| **Medical parasitology and mycology (Sem I) (12 hours)** |  |  |
| 1. Laboratory diagnosis of: amoebiasis, trichomoniasis, lambliasis, cryptosporidiosis (S11) | -“- | 3 |
| 2. Laboratory diagnosis of teniases, cysticercosis, hydatidosis (S12) | -“- | 3 |
| 3. Laboratory diagnosis of diseases caused by *Ascaris lumbricoides, Enterobius vermicularis, Trichuris trichiura, Strongyloides stercoralis* (S13) | -“- | 3 |
| 4. Laboratory diagnosis in fungal infections (S14) | -“- | 3 |
| **Practical exam Sem I** (General Microbiology, Virology, Parasitology - Mycology) (W15- first week of exam period)  |  |  |
| **Sem II – Special bacteriology (40)** |  |  |
| 1. Testing the bacteria sensitivity to antibiotics. Difusimetric method. Quantitative assays; phenotypes of resistance and their importance in medical practice | -“- | 3 |
| 2. Identification of staphylococci. Blood culture in diagnosis of infections. | -“- | 3 |
| 3. Identification of beta – hemolytic streptococci. Bacteriologic exam of pharyngeal exsudate.  | -“- | 3 |
| 4. Identification of gram negative coccobacilli. Bacteriologic exam of sputum.  | -“- | 3 |
| 5. Identification of pneumococci and enterococci. Bacteriologic exam of cerebrospinal fluid.  | -“- | 3 |
| 6. Identification of *Enterobacteriaceae* species. Cytobacteriologic exam of urine.  | -“- | 3 |
| 7. Identification of *Enterobacteriaceae* species. Stool culture | -“- | 3 |
| 8. Identification of gram negative non-fermentative bacilli. Bacteriologic exam of pus.  | -“- | 3 |
| 9. Diagnosis of infections produced by *C difficile* and *H. pylori.* **Test Special Bacteriology**  | -“- | 3 |
| 10. Identification of mycobacteria. Laboratory diagnosis of lung tuberculosis.  | -“- | 3 |
| 11. Identification of spirochetaes. Laboratory diagnosis of syphilis and leptospirosis. | -“- | 3 |
| 12. Identification of *Neisseria*. Sexually transmitted infections. | -“- | 3 |
| 13. Identification of gram positive bacilli. Slide reviewing.  | -“- | 3 |
| 14. **Practical exam Sem II** Special Bacteriology  |  |  |
| **Bibliography**1. PP courses presentation and PW protocols (posted on *e-learning platform*).
2. Buiuc D.: Microbiologie Medicală, ed. a VI-a, Editura “Gr. T. Popa” Iaşi, 2003.
3. Murray PR et al.: Medical Microbiology, 8th, Wolfe International Student Edition, 2015.
4. Jawetz Melnick&Adelbergs Medical Microbiology, 26th edition, 2012.
5. Luca Mariana. Parazitologie si Micologie medicală. Editura UMF Iaşi, 2005.
6. Rădulescu Simona. Parazitologie medicală. Editura All Educational, Bucureşti, 2000.
7. Lazăr Lidia. Baze practice in parazitologia medicala. Editura Publistar, Bucuresti, 2000.
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1. **Correlations between the contents of the discipline and the expectations of the epistemic community, of profesional associations and of employers in the field**

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| The knowledge and skills are established as didactic objectives and specified as such in analytical programs reviewed annually. After the analysis within the discipline, they are discussed and approved within the Curriculum Office, in order to harmonize with other disciplines. Throughout this course, the correspondence between the content and the expectations of the academic community, community representatives, professional associations and employers is systematically evaluated, as far as possible. As a primary purpose, the discipline aims to provide students with optimal premises for the next years of study within the Bachelor of Medicine program, with a view to successfully engaging, immediately after graduation, in residency programs in Romania and other EU countries. Modernization of the notions taught, in the context of the 21st century: from the classical diagnosis, to the techniques of molecular biology in support of the microbiological diagnosis (rapid identification, establishing the genotype and the mechanisms of resistance to antibiotics); new virulence factors and mechanisms, state-of-the-art antimicrobials. Microbiology, as a useful tool for the clinician and the epidemiologist, for the diagnosis / treatment and surveillance/prevention of infectious diseases, including for the infections associated with the medical care and within the rapid alert system (confirmation with the laboratory in order to support the clinical and laboratory criteria, within the case definition for a certain infectious disease). Microbiology is indispensable for the disciplines directly associated with this field (infectious diseases, epidemiology), but also for the medical-surgical disciplines that are confronted with diseases of microbial etiology. |

1. **Evaluation**

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| **Type of activity**  | **10.1. Evaluation criteria:**  | **10.2. Methods of evaluation** | **10.3. Percentage of final grade** |
| **10.4. Lecture** | - knowledge related to general microbiology and component modules: special bacteriology, virology, parasitology, micology | - Sem I - Unique test, 60 questions related to general microbiology, virology and parasitology – mycolo-gy.- Sem II - Unique test, 60 questions from special bacteriology | 50% |
| **10.5. Seminar / Laboratory** | Activity during the year: active participation, attendance, discipline | ongoing evaluation | 10% |
| The notions taught at LP | practical exam | 40% |
| * **The students should prove the achievement of the next basic information:**
* decontamination and aseptic procedures;
* the main microscopic categories;
* the main pathologic products necessary to diagnose the associated human diseases (respiratory, digestive, urinary, cutaneous and CNS infections, STDs);
* the interpretations of microbiological results and of medical importance clinical isolates;
* the basic principles of antimicrobial therapy;
* particularities of sampling of pathological products for virological diagnosis;
* sero-diagnosis and the significance of the presence of antibodies;
* diagnosis in viral hepatitis and HIV infection;
* macroscopic and microscopic characters of the main parasites involved in human pathology;
* principles of diagnosis in fungal infections.
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| **Date:****30.09. 2019** | **Signature of Didactic Coordinator**  |  |
| **Prof. univ. dr. Luminița Smaranda Iancu** |  |
|  | **Signature of Department Director** **Conf. univ. dr. Florin Dumitru Petrariu** |